PERICOLO VULCANI
La ricerca scientifica per la mitigazione del rischio vulcanico in Italia

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Scenari di Pericolosità e Danno SPeeD PROJECT - TASK 1.1
Connection of the "Centri Funzionali" of DPC and RC to the monitoring system of INGV-OV

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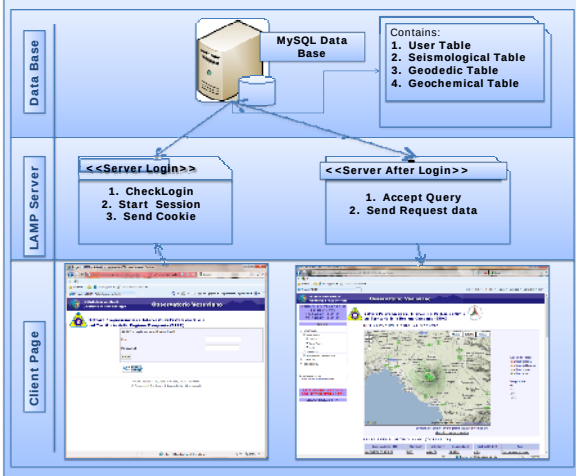


Activities

- Project specifications;
- Server design & realization for the management of the multiparametric data, alarm and notifications provided by the OV-INGV monitoring system;
- Multiparametric database design & realization for the geophysical and geochemical parameters management;
- Connection of the OV monitoring center and the "centro funzionale multirischio della regione campania" with an intranet protected link (using the present connections to internet of the two centers);
- Graphic interfaces (GUI) design for the user access and visualization of the multiparametric data, alarms and notifications;
- Link of the system to the "Centro Funzionale" DPC (preserving the compatibility with the dpc-ingv communications protocols).

Realizations

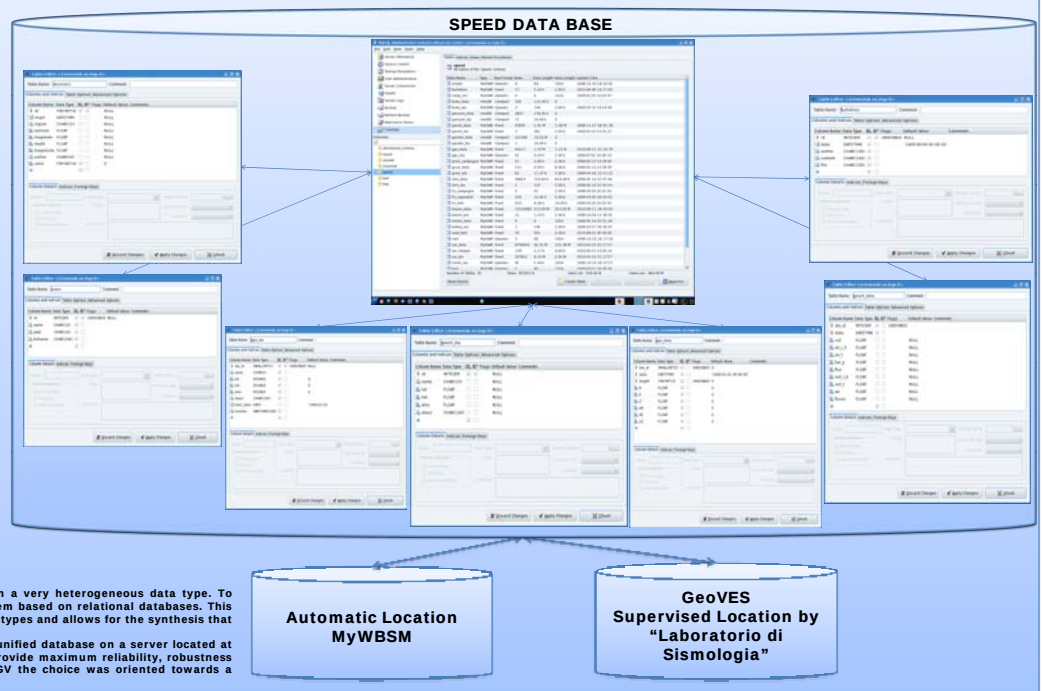
- Server system is based on GNU/Linux Operating System – Apache WEB Server.
- MySQL 5.0 data base (version InnoDB) , a transactional storage engine with commit, rollback e crash recovery capability.
- SQLServer data base (GeOVes) for the supervised Seismic Data;
- Perl, PHP or Pyton scripting languages;
- Web Interfaced System – Maps powered by Google.

Data

Data are provided by U.F. "Centro di Monitoraggio", U.F. "Geodesia", U.F. "Geochimica" of the OV - INGV

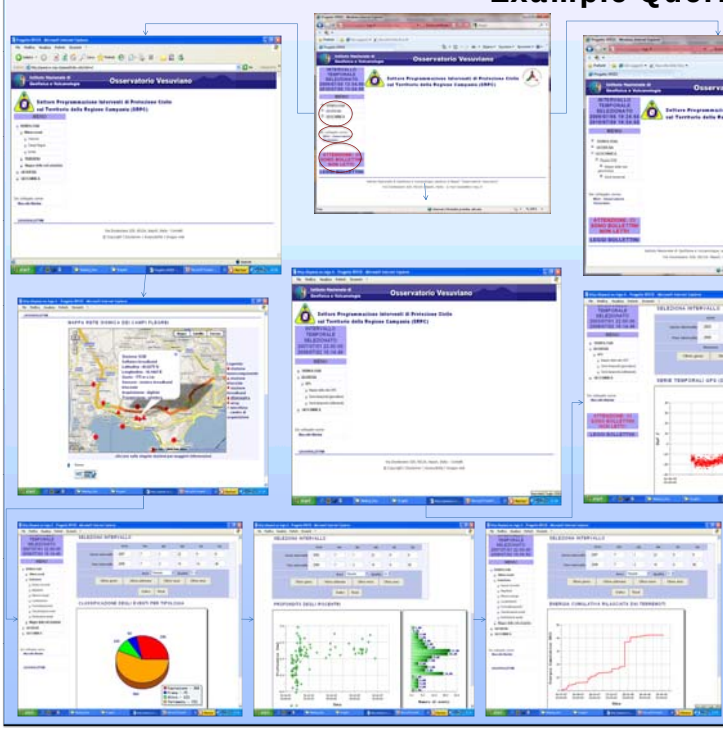
Software components

- The LAMP stack is widely used because it offers a great number of advantages for developers;
- Easy to deploy: Since PHP is a standard Apache module, it's easy to deploy a PHP application, once you've got MySQL running;
- Develop locally: It's easy to set up LAMP on your laptop, build your application locally, then deploy on the Web;
- Cheap and ubiquitous hosting: Even the cheapest Web hosts options allow you to run PHP and MySQL;
- Linux is a Unix-like computer operating system kernel. A major emphasis of Linux development is security, which makes it an appealing choice for a web-server application. Like the other LAMP components, Linux is free open-source software which means the source code is provided with operating system, which can be edited according to specific needs. Also, because Linux-based operating systems are Unix-like, a Linux server is more natively-compatible with other server-oriented platforms, such as Solaris and BSD, than non-Unix-like systems like Microsoft Windows;
- Apache is a free software open source web server, the most popular in use. Apache supports a variety of features, many implemented as compiled modules which extend the core functionality. These can range from server-side programming language support to authentication schemes. Some common language interfaces support Perl, Python, Tcl, and PHP. Popular authentication modules include mod_access, mod_auth, mod_digest, and mod_auth_digest, the successor to mod_digest. A sample of other features include SSL and TLS support (mod_ssl), a proxy module (mod_proxy), a URL rewriter (also known as a rewrite engine, implemented under mod_rewrite), custom log files (mod_log_config), and filtering support (mod_include and mod_ext_filter). Popular compression methods on Apache include the external extension module, mod_gzip, implemented to help with reduction of the size (weight) of web pages served over HTTP. ModSecurity is an open source intrusion detection and prevention engine for web applications. Apache logs can be analyzed through a web browser using free scripts such as AWStats/W3Perl or Visitors.
- MySQL is a multithreaded, multi-user, SQL database management system (DBMS) with more than eleven million installations. Since 16 January 2008, owned by Sun Microsystems, as of 20 April 2009, Oracle Corporation has agreed to purchase Sun Microsystems;
- PHP is a reflective programming language originally designed for producing dynamic web pages and it is used mainly in server-side application software. Perl and Python can be used similarly.



Data collected by different methods of monitoring are presented in a very heterogeneous data type. To ensure a meaningful parametric synthesis has chosen to use a system based on relational databases. This system guarantees the possibility of uniform access to different data types and allows for the synthesis that can be presented in a "friendly mode" to the end user.
From the hardware point of view was first chosen to centralize the unified database on a server located at INGV-OV departement. The server technology has been chosen to provide maximum reliability, robustness and speed of access. Under longstanding experience in the OV-INGV the choice was oriented towards a high-end server with high storage capacity and memory.

Example Queries



The web interface allows queries over arbitrary time intervals. Once selected an interval it is possible to plot graphics of seismological, geodetical and geochemical parameters over the same time scale.
Interactive maps based on Google Maps API technology allows the selection of a measurement station, the visualization of its features and the cration of a plot with the relative time series.